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Short Communication

TOXICITY OF PETROL OIL ON *SPIRULINA PLATENSIS*

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Abstract: In 1947, UN declared *Spirulina* as "the best food for tomorrow". It is very rich in protein content. In the present study we have determined the effect of petrol oil on *Spirulina platensis* growth rate. It is exposed to different concentration of petrol oil to see the effect of petrol on the protein, carbohydrate and growth rate of *Spirulina platensis.* It involved 2,5,10 and 20 ml of petro oil in the media after which the survival and the growth of the *S. platensis* were evaluated. Although the percentage of protein and carbohydrate decreased as the quantity of the petrol oil added to the media comparison to the control samples. The results obtained in this study showed that spillage of mixture of gasoline poses threats to the survival and development of algae and plants.

Keywords: Cynobacteria, *Spirulina platensis*, Petroleum, Pollution, Gasoline.

INTRODUCTION

Spirulina is a blue green alga. It is a commercially important filamentous *cynobacterium* that is grown in large scale and processed industrially (Dillon *et al.,* 1995). It is now produced by several companies and sold in many health food stores around the world. Petroleum has been recognized as a potential environmental contaminant since shortly after the beginning of the Twentieth Century.

MATERIALS AND METHODS

Organism: Pure *Spirulina platensis* was obtained from Department of Biotechnology, Jiwaji University, Gwalior (M.P.)

Culture Medium: *Spirulina* was grown in the Zarrouk's medium (Zarrouk, 1966) $NaCo_3$ was added after autoclaving and pH was adjusted to with 1N NaoH. Different petrol oil concentration (1,2,4 and 10ml/100ml) was added directly to the culture medium.

Incubation and maintenance of culture: The culture of *Spirulina platensis* was incubated and maintained in a culture room at a temperature of 30°C under cool white fluorescent tubes in 12/12-hour dark light cycle. The cultures were shaken twice a day manually.

Growth Measurement: The growth rate in the culture media was monitored by measuring an increase in carbohydrates, chlorophyll-a content and protein content in the presence of different petrol oil concentrations. The specific growth rate (μh^{-1}) was calculated by following formula (Guillard, 1973):

$$\mu = log\ (N_2/N_1)\ x\ (2.303/t)$$

where, $t = T_2 - T_1$.
N_1 initial optical density at time T_1.
N_2 initial optical density at time T_2.

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Chlorophyll-a estimation (Mackinney, 1941): Known volumes (3ml) of *Spirulina platensis* culture was harvested by centrifugation (5000rpm, 10 minutes) and the resulting pellet was re-suspended in the equal volume amount (3ml) of methanol. After thorough mixing, the suspension was kept at 40C for 24 hours. Thereafter, it was centrifuged, and the absorbance of the cell free metabolic extract was recorded at 663 nm against methanol as a blank.

Estimation of protein content (Lowry, 1951): 0.5 ml of the homogenized algal culture was taken in a test tube and 0.5 ml of 1N NaOH was added to it and then placed in boiling water bath for 5 minutes. After cooling in the cold water 2.5ml of reagent "B" was added and allowed to react for 10 minutes. 0.5ml of 1N Folin reagent was then added and mixed thoroughly and allowed to stand for 30 minutes for development of blue color, and then centrifuged at 5000 rpm for 10 minutes. The absorbance of the clean liquid was measured at 650nm, and the amount of algal cell protein calculated as µg /ml culture with reference to a standard-calibrated curve, obtained with BSA. The same procedure was adopted in preparing standard curve using graded concentration of BSA.

RESULTS AND DISCUSSION

The growth conditions for *S. platensis* were optimized in Zarrouk's medium. In term of biomass production (mg/ml) temperature =30°C and pH=9 was found optimum for growth.

As shown in figure 1, the percentage of the growth rate was affected by the quantity of the gasoline added to the samples. The growth rate generally decreases with the increase in the quantity of gasoline in the

samples while the protein and carbohydrate content decreased slightly with increased gasoline in the samples (figure 1, 2 and 3 respectively). Both the 10 and 20 ml treatments a significant decrease in the growth rate of the *Spirulina platensis* ($P < 0.05$)

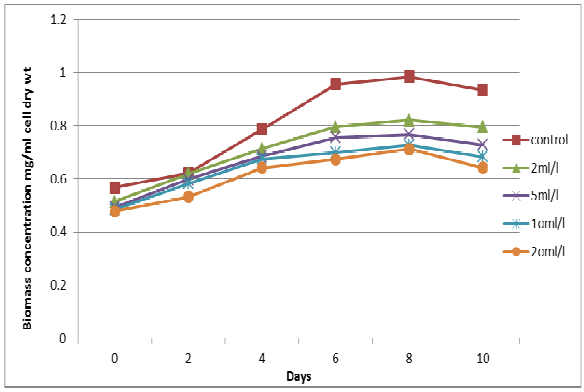

Figure.1: Effect of petrol on the growth of *Spirulina platensis.*

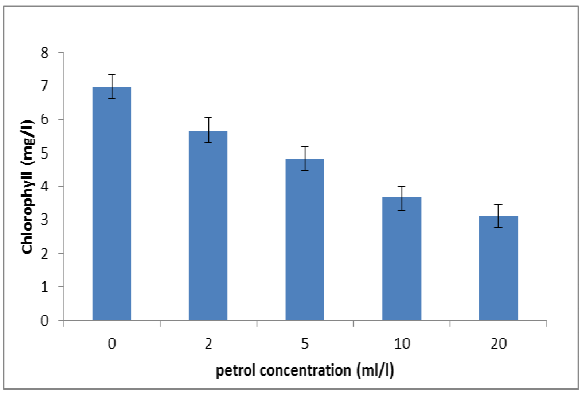

Figure.2: Effect of petrol stress on the chlorophyll content of *Spirulina platensis*

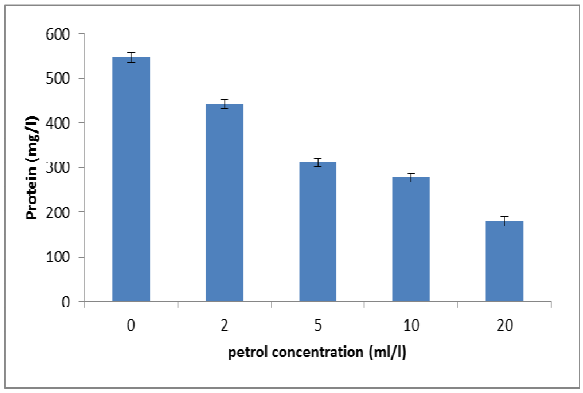

Figure.3: Effects of 0, 2, 5, 10and 20 ml/l petrol on protein content of *S. platensis*.

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